

Low Intrusive Fiber Optic-Plug for TPS Materials, Phase I

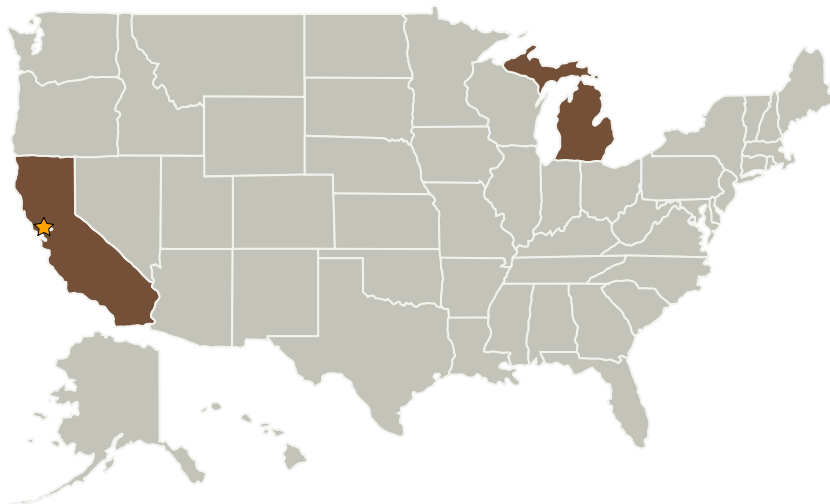
Completed Technology Project (2007 - 2007)



Project Introduction

Heat shield technology is a critical component of manned spaceflight. In particular, the new Crew Exploration Vehicle (CEV) requires thermal protection systems (TPS) beyond the current state of the art. While new TPS shields are under development, a key difficulty is the ability to diagnose TPS performance. Technology demonstrator missions are being planned, but designing instrumentation capable of surviving the reentry environment is a non-trivial challenge. We propose the development of a low intrusive fiber optic plug insert for TPS materials that will enable spectrographic measurements of the reentry environment surrounding an ablating TPS. This would provide benchmark data for fundamental flow, radiation, and materials modeling as well as provide operational correlations between vehicle reentry drag and radiation if implemented in a TPS flight test. In addition to spectrographic data, the proposed technology will also intrinsically provide a highly reliable measurement of TPS ablation rates. These fiber-optic plug inserts provide an enabling capability for reentry spacecraft development. The program proposed here will take the concept, originally encouraged at the request of researchers at NASA Ames, from concept to demonstration, through prototype, to a technology readiness level suitable for inclusion in the design of an ablation shield flight demonstrator mission.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation
Research/Small Business Tech
Transfer

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Organizations Performing Work	Role	Type	Location
★ Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
ElectroDynamic Applications, Inc.	Supporting Organization	Industry Minority-Owned Business	Ann Arbor, Michigan

Primary U.S. Work Locations

California	Michigan
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Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
 - └ TX09.4 Vehicle Systems
 - └ TX09.4.5 Modeling and Simulation for EDL